CSCI 8945
Advanced Representation Learning
Fall 2020

Instructor
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Time and Location of the Lectures:
Online
• Synchronous: Lectures; Course Projects (Proposal, Update, Presentation)
• Asynchronous: Paper Presentations

Office Hours and Location
Zoom meetings by email appointment.

Course Description
This course presents a rigorous overview of advanced representation learning algorithms in machine learning, from the traditional subspace learning models to the recent deep representation learning models. Applications in the fields of computer vision, data mining, and natural language processing will be covered.

This course will be research oriented, encouraging students to explore the recent advances in machine learning field. The instructor will review the basic concepts of representation learning and briefly introduce some advanced topics. After that, students will in turn present research papers from the reading materials. In addition, students will need to work on a research project on machine learning theory, methodology, or applications.

Course Objectives
Students will learn how to use and design representation learning algorithms for real-world problems.
Recommended Prerequisites
CSCI 6380 or CSCI 6550

Credit Hours
4

Text(s)
No textbooks. The course materials are mainly from recent research papers in the machine learning field.

Course Topics
1. Overview of machine learning
2. Subspace learning
3. Manifold learning
4. Low-rank learning
5. Deep auto-encoders and CNN
6. Recurrent Networks
7. Adversarial Networks
8. Graph neural networks
9. AutoML

Grade Distributions

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Paper Review</td>
<td>30%</td>
</tr>
<tr>
<td>Paper Presentations</td>
<td>20%</td>
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<tr>
<td>Final Project</td>
<td>50%</td>
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Reading Assignments and Paper Reviews

Students will be required to review 10 papers over the semester and submit the review to eLC by 11:59PM of the due date shown in class schedule on course website. The reviewed paper should be chosen from the papers that will be presented in the following classes (Refer to classes schedule for more details). The reviewed papers should not contain the papers you’re going to present in the class. The review should summarize the main idea and contributions of the paper, describe the major experimental results, and discuss the strengths and weaknesses of the paper. The students are also encouraged to check the follow-up works on the topic of the assigned paper (e.g., search the latest papers that cite the assigned paper), summarize the state-of-the-art methods and results, and discuss possible future research directions.
Class Participation and Paper Presentations

Each student will be required to present two research papers over the semester. Each presenter should prepare slides for a 30 minutes talk on the paper. Recordings of the paper presentation must be submitted to eLC by midnight (12:00am) before the class. The talk should clearly address the following points: (1) motivation and problem statement; (2) related work; (3) methodology; (4) experiments; (5) conclusions; and (6) at least 3 questions for discussions. Discussions will be held on eLC.

Research Project

Students are required to work on an individual or group (no more than three students) research project on machine learning over the semester. Research project will be evaluated based on the novelty, efforts, technical soundness, presentations, and the quality of final report.

Academic Integrity and Ethics

We will strictly follow UGA’s Academic Honesty Policy. Dishonest behavior will not be tolerated and may result into failing the course. Please contact the instructor if you have any concerns regarding this issue.

Face Coverings

Effective July 15, 2020, the University of Georgia—along with all University System of Georgia (USG) institutions—requires all faculty, staff, students and visitors to wear an appropriate face covering while inside campus facilities/buildings where six feet social distancing may not always be possible. Face covering use is in addition to and is not a substitute for social distancing. Anyone not using a face covering when required will be asked to wear one or must leave the area. Reasonable accommodations may be made for those who are unable to wear a face covering for documented health reasons. Students seeking an accommodation related to face coverings should contact Disability Services at https://drc.uga.edu/.

DawgCheck

Please perform a quick symptom check each weekday on DawgCheck—on the UGA app or website—whether you feel sick or not. It will help health providers monitor the health situation on campus: https://dawgcheck.uga.edu/.

What do I do if I have symptoms?

Students showing symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5 p.m.). Please DO NOT walk-in.
For emergencies and after-hours care, see https://www.uhs.uga.edu/info/emergencies.
What do I do if I am notified that I have been exposed?

Students who learn they have been directly exposed to COVID-19 but are not showing symptoms should self-quarantine for 14 days consistent with Department of Public Health (DPH) and Centers for Disease Control and Prevention (CDC) guidelines. Please correspond with your instructor via email, with a cc: to Student Care & Outreach at sco@uga.edu, to coordinate continuing your coursework while self-quarantined. If you develop symptoms, you should contact the University Health Center to make an appointment to be tested. You should continue to monitor your symptoms daily on DawgCheck.

How do I get a test?

Students who are demonstrating symptoms of COVID-19 should call the University Health Center. UHC is offering testing by appointment for students; appointments may be booked by calling 706-542-1162. UGA will also be recruiting asymptomatic students to participate in surveillance tests. Students living in residence halls, Greek housing and off-campus apartment complexes are encouraged to participate.

What do I do if I test positive?

Any student with a positive COVID-19 test is required to report the test in DawgCheck and should self-isolate immediately. Students should not attend classes in-person until the isolation period is completed. Once you report the positive test through DawgCheck, UGA Student Care and Outreach will follow up with you.

Mental Health and Wellness Resources

- If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.
- UGA has several resources for a student seeking mental health services (https://www.uhs.uga.edu/bewelluga/bewelluga) or crisis support (https://www.uhs.uga.edu/info/emergencies).
- If you need help managing stress, anxiety, relationships, etc., please visit BeWellUGA (https://www.uhs.uga.edu/bewelluga/bewelluga) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.
- Additional resources can be accessed through the UGA App.